ABSTRACT OF THE DISCLOSURE

A method for choosing an image from a plurality of three-dimensional models which is most similar to an input image is provided. The method includes the steps of: (a) providing a database of the plurality of three-dimensional models; (b) providing an input image; (c) positioning each three-dimensional model relative to the input image; (d) for each three-dimensional model, determining a rendered image that is most similar to the input image by: (d)(i) computing a linear subspace that describes an approximation to the set of all possible rendered images that each three-dimensional model can produce under all possible lighting conditions where each point in the linear subspace represents a possible image; and one of(d)(ii) finding the point on the linear subspace that is closest to the input image or finding a rendered image in a subset of the linear subspace obtained by projecting the set of images that are generated by positive lights onto the linear subspace; (e) computing a measure of similarly between the input image and each rendered image; and (f) selecting the three-dimensional model corresponding to the rendered image whose measure of similarity is most similar to the input image. Step (d) is preferably repeated for each of a red, green, and blue color component for each three-dimensional model. The linear subspace is preferably either four-dimensional or nine-dimensional.